

Telescopes in Near Space: Balloon Exoplanet Nulling Interferometer (BigBENI)

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ABSTRACT

A significant and often overlooked path to advancing both science and technology for direct imaging and spectroscopic characterization of exosolar planets is to fly “near space” missions, i.e. balloon borne exosolar missions. A near space balloon mission with two or more telescopes, coherently combined, is capable of achieving a subset of the mission science goals of a single large space telescope at a small fraction of the cost. Additionally such an approach advances technologies toward flight readiness for space flight. Herein we discuss the feasibility of flying two 1.2 meter telescopes, with a baseline separation of 3.6 meters, operating in visible light, on a composite boom structure coupled to a modified visible nulling coronagraph operating to achieve an inner working angle of 60 milli-arcseconds. We discuss the potential science return, atmospheric residuals at 135,000 feet, pointing control and visible nulling and evaluate the state-of-art of these technologies with regards to balloon missions.